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Financing

Green Infrastructure

The frequency and intensity of storms, whether they are hurricanes or other extreme events, pose significant challenges for communities, including the need for effective stormwater controls to meet Clean Water Act requirements and to ensure strong protections for public health and the environment.

Authors Dominique Lueckenhoff and Seth Brown discuss needs and effective financing solutions for building a comprehensive integrated green stormwater infrastructure program that combines the strengths of green and grey solutions to provide multiple community benefits, including mitigation and rehabilitation of critical infrastructure damaged by extreme wet weather events.

Financing Integrated Green Stormwater Infrastructure to Improve Community Health, Resiliency – Getting the Best Deal for the Money!

BY DOMINIQUE LUECKENHOFF AND SETH BROWN

As storms sweep across the United States with more frequency and greater intensity, the need to address the impacts of flooding increases. These days, one can hardly escape constant news of crippling storms and flash flood emergencies from a growing number of extreme weather events around the country. For example, the unanticipated ravages of Hurricane Matthew along the Southeastern seaboard last week is already estimated to have mult-billion dollar impacts. Houston experienced unprecedented rainfall volumes earlier this year, including 17.6 inches within a 24-hour period in April, which impacted over 1,000 homes, required over 1,200 rescues, led to eight deaths and caused over $5 billion worth of infrastructure and property damage. In August, Baton Rouge, La., saw two feet of rain fall within 24 hours, inundating the city, killing at least nine people, and prompting the rescues of about 20,000. As of May, an unprecedented number of thunderstorms continued to affect parts of Iowa, Kansas, Missouri, Nebraska and Texas, closing down roads and leaving many people stranded, with severe damage to all matter of facilities and disruption to all forms of transportation, resulting in unforeseen damages and mounting costs to society. In addition, President Barack Obama declared a major disaster for West Virginia following the severe storms, flooding, and landslides killing 23 people and leaving thousands homeless.

And who can ever forget Superstorm Sandy with its sweeping and unpredictable devastation—starting in the Caribbean and barreling up the East Coast in late October 2012, leaving nearly 150 dead, thousands homeless and millions in 15 states without power. Travel and commerce came to a halt, and fuel was in

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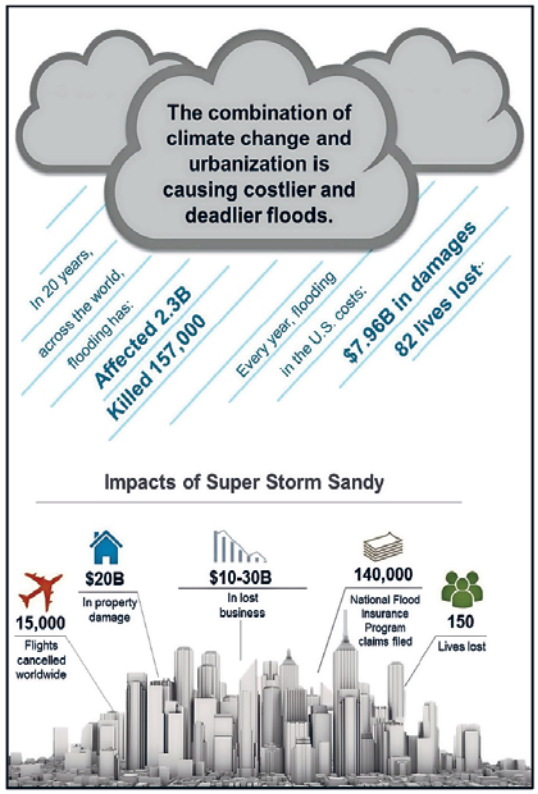
short supply, leading to the closures of most gas stations. More than 15,000 flights were cancelled worldwide.

Sandy caused about $20 billion in property damage and $10 billion to $30 billion more in lost business, making it one of the costliest natural disasters in U.S. history. The storm exposed vulnerabilities in the region's public transportation and infrastructure and underscored the nation's growing exposure to extreme weather events, sea-level rise and coastal flooding. The National Flood Insurance Program (NFIP) has paid nearly $15 billion in claims. Government payouts under the NFIP are estimated to be between $12 billion and $15 billion. In the immediate aftermath of Sandy, this amount quickly exceeded the $4 billion in cash and remaining borrowing authority from the Treasury Department. By January 2013, the NFIP had processed more than 140,000 claims for Sandy-related damages totaling about $1.7 billion. The damages from Sandy may be dwarfed by Hurricane Matthew that churned up the southern portion of the Eastern Seaboard last week. Damages due to wind and storm surge damage have been estimated by research firm, CoreLogic, to range between $4 billion and $6 billion.

These examples show that stormwater controls, required under the Clean Water Act, should be viewed as basic necessities and priority funding investments if we are to improve community resiliency to better protect our water resources and public health, while reducing overall costs to society.



The Potential of Green Infrastructure.

Needs go beyond impacts due to extreme weather, rising tides and floodwaters. There are also growing concerns about water quality. The price tag to address threats to drinking and recreational waters, among other challenges, is in the billions of dollars. The common thread among all of these issues is urban stormwater runoff, which washes off impervious surfaces (rooftops, roadways, sidewalks, etc.) in urban/suburban areas, delivering pollutants into creeks, streams and rivers. Additionally, higher volumes and rates of runoff due to urbanization increase flooding and impair surface water health. Lastly, increased volumes of runoff can overwhelm combined sewer systems leading to discharges of raw sewage or partially-treated wastewater, resulting in significant public health hazards. Under the Clean Water Act, municipal separate storm sewer systems (MS4s) must obtain a National Pollutant Discharge Elimination System (NPDES) permit and meet requirements for collecting and conveying stormwater prior to discharging to waters of the U.S. MS4 permittees must also plan and implement stormwater control practices consistent with requirements to minimize the discharge of pollutants from the sewer system, which increase challenges related to both performance and financing.

A multi-pronged challenge requires a multi-pronged solution. One such area of increasing interest for investment by communities to mitigate for such impacts is green stormwater infrastructure (GSI). The use of natural and man-made systems can enhance infrastructure resiliency by reducing peak flows, improving water quality and quantity protection, while driving stronger local economies, property values, public health and safety. GSI practices, which include green roofs, permeable pavements, tree planters and bioretention (rain gardens) can help restore the hydrologic integrity of watersheds, temper the urban heat island effect and reduce peak energy consumption and offset high energy bills while reducing greenhouse gas emissions. Additionally, GSI investments can create local, sustainable, entry-level jobs required to maintain these high-value community assets that can also address urban blight by attracting economic redevelopment and revitalization investments. The wealth-building benefit of GSI makes this type of investment especially attractive for socioeconomically challenged communities that are struggling to meet Clean Water Act regulations as well as address issues of resilience in the face of a changing climate regime and rising sea levels.

Many communities have integrated GSI into programs to address flooding and water quality in a ''grey-green'' approach. For example, the Milwaukee Metropolitan Sewerage District (MMSD) has its ''Greenseams'' program, that makes voluntary purchases of undeveloped, privately-owned properties along streams, shorelines and wetlands in areas where growth is likely to occur. By utilizing the infiltration ca-

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pacity of these areas in upstream zones, MMSD is providing flood management and protecting and enhancing downstream flood protection projects. Greenseams has resulted in the protection of over 3,000 acres of green space and enhanced flood management more cost-effectively than a solution comprised entirely of grey infrastructure (i.e., pipes, concrete channels, flood protection basins), according to a 2010 report by the nonprofit Center for Neighborhood Technology called The Value of Green Infrastructure: A Guide to Recognizing Its Economic, Environmental and Social Benefits. Dave Fowler, MMSD senior project manager and certified flood manager, explains in an Association of State Floodplain Managers study, that this green-gray solution ''will never completely replace capital (gray) infrastructure, (but) it goes a long way in reducing the overall costs on operation and maintenance.'' This use of integrated GSI leverages the ''backbone'' of grey infrastructure and provides enhanced resilience, water quality and quantity treatment, and social co-benefits that deliver a more holistic solution to communities.

The use of GSI to aid in flood protection has been increasing, which prompted the EPA to study the economic benefits of its wide-spread adoption. This EPA report quantifies the estimated savings and total benefit gained from GSI adoption to address flooding impacts for the U.S. between 2020 and 2040. The study estimates that between $63 and $136 million worth of savings (in 2011 dollars) could be realized through more widespread adoption of GSI in new development and redevelopment projects. The corresponding total benefit of these savings ranges between $500 million and $1 billion, the EPA study, Flood Loss Avoidance Benefits of Green Infrastructure for Stormwater Management, said.

While GSI has the potential to address multiple challenges and to deliver social and economic co-benefits, the pace and scale of its implementation has been limited by its high cost—perceived or real (especially for urban retrofits, which provide treatment of runoff from areas with existing impervious cover)—and the limited funds that can be generated through status quo revenue generation and financing approaches. To overcome these barriers, new ways to drive down costs and increase revenue and financing solutions are needed.

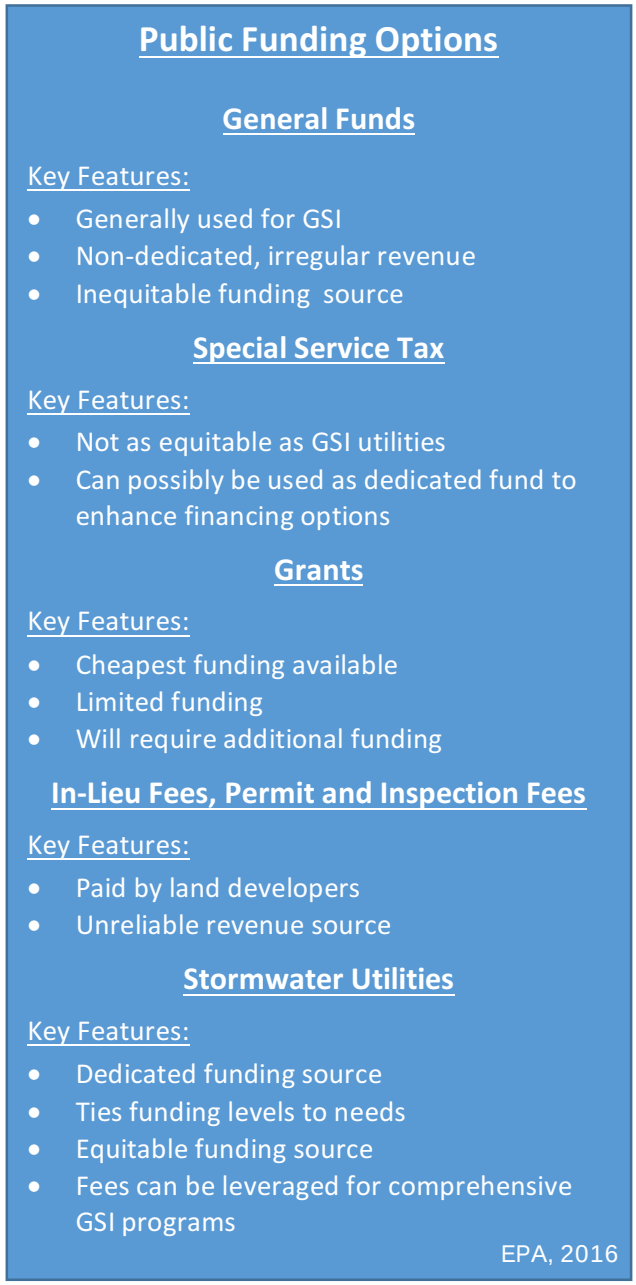
Public Funding Options.

One of the most common forms of financing stormwater infrastructure is through general funds at the municipal level. General funds are usually derived through property taxes and or other local taxes with an annual allocation of a specified percentage of revenues for stormwater and other infrastructure and operational needs. These annual amounts can vary from year to year, and stormwater is not typically a priority funding area, which makes long-term planning for stormwater management challenging while limiting financing options. The allocation of general funds is not equitable since it does not correlate with the amount of stormwater runoff generated by the entity being taxed.

A better option is the use of a special service tax or fee, which may be derived from similar revenue sources; however, a special service tax may require that a specified percentage of revenues be allocated for stormwater infrastructure investments. Depending upon the level of protection of these funds, this pool may be considered a dedicated funding source. In either case, these are funding approaches that lack dimensions of equity because their structure does not correlate with the amount of stormwater generated by the taxed entity to the amount of revenue paid. For example, the stormwater runoff from the impervious area of a large parking lot is significant, but its use of metered water is relatively small.

Other ancillary revenue sources are fees associated with reviewing, permitting and inspecting plans and projects related to stormwater management, as well as an option for a developer to pay a fee in-lieu of meeting stormwater management obligations for a development project.

Grants from a variety of sources–public and private—may also be available for local governments to support green infrastructure design and implementation. However, these funds tend to be competitive, prescriptive

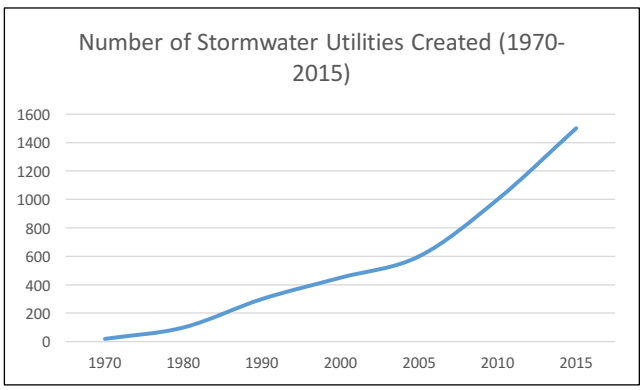


and limited in amounts large enough to support the extensive community stormwater needs.

While these sources of funding can be helpful, funds derived from annual general funds, grants and or fees are not adequate to fund a comprehensive, ongoing stormwater management program.

GSI Utilities & Dedicated GSI Fees.

In 2003, EPA promulgated Phase II of the MS4 program which brought in about 6,600 more communities for regulation by lowering the population threshold and other metrics for identifying urban areas that would be covered by the stormwater program. This resulted in a surge of interest to establish dedicated funding programs to pay for stormwater infrastructure investments. The most common took the form of a ''stormwater utility,'' which is a revenue vehicle that directs dedicated funds to stormwater management efforts and programs and usually resides in a department of public works or the equivalent. The number of stormwater utilities has grown to approximately 1,500 across the U.S., which represents only approximately 20 percent of MS4 communities, according to a 2013 Western Kentucky University GSI Utility Survey. This relatively low number of utilities has limited funding and financing potential in the stormwater sector.



Adapted from EPA, 2009

Fees associated with stormwater utilities can be generated through a variety of scenarios, but most are based on parcel size and more recently, impervious cover on a given property. This means the larger and highly impervious sites will pay a higher fee than a smaller parcel with less impervious cover. This tie between impervious cover and fee amount creates a more equitable relationship between revenues collected and runoff volume generated from a site. Annual fees charged by stormwater utilities also serve as the prerequisite collateral for raising debt and funding comprehensive stormwater programs at a very low cost. For instance, a municipality that collects $2 million in stormwater utility fees can leverage them into an additional $27 million of capital, assuming a 4 percent rate of interest and a 30-year term, that can be used to fund both soft costs (programmatic) as well as hard costs (implementing and maintaining GSI).

SRF Funding.

Under Title VI of the Clean Water Act, EPA has two revolving loan funds that are operated through EPA regional offices and administered by each state. The Drinking Water State Revolving Fund (DWSRF) supports investments to drinking water treatment plants and distribution systems while the Clean Water SRF funds the capital costs of water quality improvement investments, including publicly owned treatment facilities, such as wastewater treatment plants, and projects addressing water conservation and re-use, estuary protection, nonpoint source and stormwater control, including GSI retrofits, through the Green Project Reserve, according to EPA's 2014 report, Getting to Green: Paying for Green Infrastructure Financing Options and Resources for Local Decision-Makers. The Green Project Reserve enables SRFs to fund critical green infrastructure, in addition to water and energy efficiency improvements and other environmentally innovative activities.

Since 1989, the two SRFs have provided more than $130 billion in funding. The program was amended in 2014 by the Water Resources Reform and Development Act, extending the terms and expanding project eligibility, along with enabling CWSRF loans to private entities.

The SRF program provides low-interest loans to borrowers, with a 20 percent match required for the state. SRF loans are generally paid back over 20 years (with terms up to 30 years). The continued success of the SRF program is dependent on future borrowings by local governments for qualified projects. The repayment of principal and interest on existing loans generates funds that are recycled into new loans creating the ''revolving'' nature of capital that is offered through the program.

SRF Terms, Conditions and Pricing.

SRF loan interest rates are set at 25 percent of prevailing municipal market rates translating to interest rates as low as 1 percent to 2.5 percent for most projects. Some states may offer loan forgiveness—effectively SRF grants—at 0 percent. Some challenges exist with regards to seeking SRF assistance. For instance, those communities unfamiliar with the SRF application process may find the initial steps lengthy and administratively burdensome. Additionally, predevelopment expenses, which refer to expenses related to project planning and due diligence activities before construction begins, may require a bridge loan for the period between the initiation of the SRF application and the date at which the funds are available for development expenditures. This SRF ''bridge loan'' period can range from six to nine months.

That said, SRF assistance is a highly affordable, available source of low interest capital for GSI. However, stormwater control projects, in general, comprise less than 5 percent of all Clean Water SRF dollars nationally. This is probably because stormwater management is less of a priority than wastewater infrastructure projects for communities, along with some confusion as to the types of stormwater projects that would qualify for SRF funding. Nonetheless, those seeking funds for GSI infrastructure projects should consider seeking SRF funding before all else because of its low interest rates and availability.

SRF ''Aaa'' Bond Insurance Program.

The default risk on SRF loans has historically been very low. SRF bonds have consistently received top ratings since 1994, according to a January 2014 report by EPA Environmental Finance Advisory Board (EFAB),

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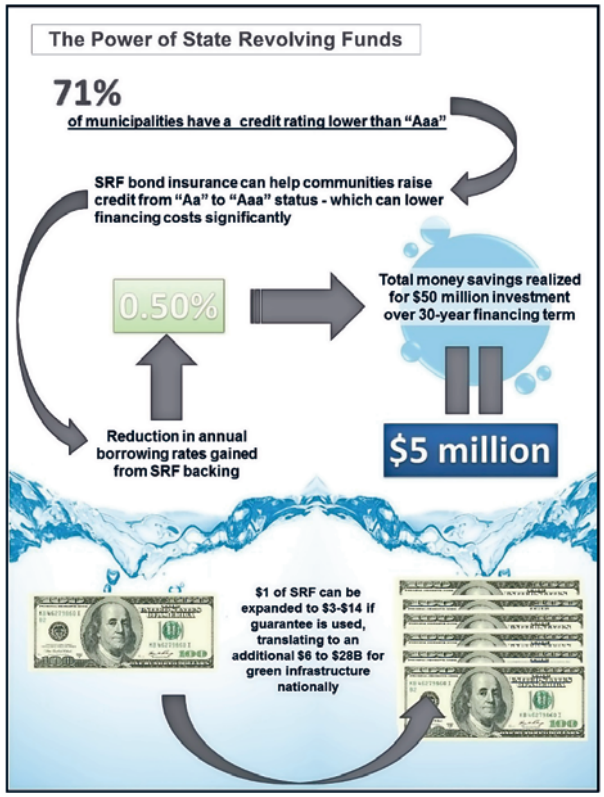
Utilizing SRF Funding for Green Infrastructure Projects. As loans repay, new loans are made and the funds are leveraged into new profits and additional lending capacity. The success of the program has created strong cash balances and excess credit capacity. In addition to the SRF loan program, states exhibiting excess credit capacity are capable of offering an ''Aaa''-rated SRF ''bond insurance'' program in which a third party guarantees payment of scheduled principal and interest in the event of a default on a bond. For example, a GSI SRF-insured bond provides investors with the added security of an SRF guarantee to pay them principal and interest even if the project ceases to pay debt service. According to the EFAB, each dollar of recycled SRF program equity can generate $3 to $14 of SRF guarantee capacity for green infrastructure projects. This translates into $6 billion to $28 billion in added potential green infrastructure funding capacity nationwide. The success of SRF also provided impetus for the creation of the ''Water Infrastructure Finance and Innovations Act'' (WIFIA) to lower the cost of capital for larger-scale water infrastructure projects.

Municipal Securities.

Municipal securities, which include short-term notes and long-term bonds that can have 40-year maturities, are some of the most common sources of funding for water infrastructure projects and can also be issued to finance GSI retrofits. These are issued by local governments or by special agencies or authorities of state and local governments to finance capital projects which also promote economic growth and job creation and are secured by various forms of collateral for repayment including utility fees, local taxes, or other similar revenue-generating vehicles. In general, municipal issuers are authorized to issue private activity bonds (PABs) and lend the proceeds to governmental or private borrowers to finance facilities, which are deemed to be a public purpose. These include roads, airports, hospitals, schools, wastewater systems, water treatment plants and GSI. The size of the municipal bond market totaled $435 billion in 2015, a 16 percent increase year over year compared to 2014 total bond issuance of $374 billion and $387 billion in 2013, according to the Bloomberg Municipal Market Brief.

The interest rate associated with a municipal security directly correlates to the security offered to investors for repayment and the associated credit rating of the bonds being issued. Ratings range from the highest long term debt rating category of ''Aaa'' down to ''Bbb,'' and ''speculative grade'' bonds ranging from ''Ba'' to ''Ca'' ratings, according to Moody's bond rating scale. Aaa-rated bonds have a very low probability of default. Ca rated bonds have a low probability of repayment and are likely on credit watch for an imminent default. While Aaa-rated communities receive the most favorable interest rates, 71 percent of the municipal bonds issued fall into the Aa category or lower. SRF bond insurance can enhance the rating of these Aa and A rated issuers by raising the bond rating to Aaa. This increase in credit quality and rating can result in savings of up to 0.25 percent and 0.50 percent in annual issuer borrowing rates. For example, the higher rating and reduction in borrowing rates can save as much as $5 million over a 30-year, $50 million bond issue.

Municipal securities fall into two categories: (i) taxable; and (ii) tax-exempt. The tax liability status of a



municipal security is mandated by IRS requirements. Interest earnings on tax-exempt municipal securities are exempt from federal taxes. These same securities may be exempt from state and local taxes as well. Municipal securities are also categorized by the collateral that secures the repayment of principal and interest for investors. Some of the relevant categories of the security pledged for repayment for both taxable and tax-exempt securities are:

(i) General Obligation Bonds (GO) are *secured by the issuer's full faith, credit and taxing power as security* to the holders of debt obligations for the repayment of principal and interest over the term of the security.

(ii) Revenue Bonds are *secured by the revenues and only the revenues generated by the project being financed* for the repayment of principal and interest over the term of the security.

(iii) Insured bonds are secured by a third-party guarantee for the repayment of principal and interest over the term of the security. For example, a GSI revenue bond can also be secured by SRF bond insurance for the repayment of principal and interest over the term of the security.

The municipal market is standardized, predictable and liquid for issuers of and investors in municipal securities. Issuers utilize a uniform set of documents and bond covenants. The market standardization enables them to frequently access the municipal markets to obtain financing for various projects with predictable terms, costs and interest rates. Investors who purchase the securities can also trade their securities in the secondary market at predictable prices. In other words, the municipal market is *efficient* for issuers and investors alike.

Public Financing Options

State Revolving Funds (SRF)

Average Interest Rate: 1-3%

Common Term: 30 years

Typical Investor(s): Sovereign Wealth Funds, US Corporations, Pension Funds, Hedge Funds, Insurance Companies

Key Features:

- Offer Loans and Bond insurance
- Tied to Clean Water Act investment needs
- Interest rate can be as low as 0%
- Can go to private entity for public-focused projects
- GSI is an eligible type of infrastructure

Municipal Bonds

Average Interest Rate: 2-4%*

Common Term: 30 years

Typical Investor(s): Retail, Mutual Funds, US Corporations, Hedge Funds, Insurance Companies, Pension Funds

Key Features:

- Interest rate tied to credit rating of community
- Most common form of infrastructure investment in U.S.
- Capital markets efficient
- Fee Securitization can reduce/minimize interest rate

EPA. 2016

Bank Loans, Other Private Financing Options.

Private banks can also provide capital to municipal issuers in the form of a loan for GSI. The loan is considered senior to all other claims against the borrower and the collateral securing the repayment of the loan. In practice, this senior position means that in the event of default, the loan has first priority for repayment above any and all other debt obligations.

Private bank loans can be a good source of short-term capital financing for GSI infrastructure. For instance, local governments that have received an SRF funding commitment, but need cash prior to receipt of SRF funds, can use private bank loans to provide financing between the time a commitment for an SRF loan is obtained and the actual funding date, a period that typically ranges between six and nine months.

Bank loans will typically not exceed five- to 10-year terms and will range from 3 percent to 5 percent in annual interest rates. They will also typically be full recourse to the borrower.

Standard & Poor's has estimated in its 2014 commentary, Alternative Financing: Disclosure is Critical to Credit Analysis in Public Finance, that direct bank loans to municipal issuers may account for as much as 20 percent of new municipal borrowings. It is believed that most of these loans were short term in nature. Bank loans can range from several months to several years with rates that vary, depending on the term of the security, from 3 percent to 5 percent for up to a five-year term.

Equity.

Equity is not a common source of funds for municipal infrastructure projects including GSI, because it is among the most expensive forms of capital available. Equity funds are typically invested in high risk projects, such as new and emerging technologies that experience significant growth and therefore yield strong profits. Therefore, they command higher rates of return and shorter lending periods and may require the municipality to relinquish some control. Such an approach could not only result in significant debt for a municipality, but also could trigger unmet regulatory and other performance requirements, for which the municipality remains responsible.

Private Financing Options

Private Bank Loans

Average Interest Rate: 4%

Common Term: 3-5 years

Typical Investor(s): Banks

Key Features:

- More expensive capital
- Effective short term funding

Equity

Average Interest Rate: 12%

Common Term: 5-10 years

Typical Investor(s): Hedge Funds, Private Equity Funds, Pension Funds, Funds of Funds

Key Features:

- Very expensive capital
- Effective if used sparingly

EPA, 2016

There are less costly sources of funding for GSI. Local government entities would rarely utilize equity as a capital source given the efficiency and ease of access to the municipal capital markets. It is reasonable, however, to use short-term equity within a larger portfolio of several financing programs, when quicker start-up is needed to establish a longer term program that requires greater flexibility, liquidity and funding than is available through SRF Programs and municipal bonds. Short-term equity funding may be an option in some situations, such as where credit-worthiness or high risk is an issue, opportunities for emerging environmental technologies and profit-based re-investments in GSI ex-

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ist, and/or quicker, flexible funding is needed due to limits of municipal bonds or SRF loans.

Equity pricing varies depending on transaction structure, the equity provider's risk perception, the percentage of debt to total project costs and the general level of interest rates. Standard equity terms include five- to 10-year investment horizons, double digit (12 percent to 15 percent) returns (depending on the specific structure) and separate financing documents and negotiations. As suggested the higher at-risk nature of equity providers also requires a sharing in cash flows after debt service.

Green Bonds, Socially Responsible Financing.

Green bonds were originally introduced by the World Bank as part of the ''Strategic Framework for Development and Climate Change'' to promote public and private investments in environmentally beneficial (green) projects. There is little difference between green bonds and traditional bonds. The types of projects that can be financed and the security pledged for repayment are the exactly the same as for municipal bonds. The only difference is the green bonds label or designation to signify a particular use of funds for environmentally beneficial projects.

In the broadest sense, the green bond designation applies to any bond from which the proceeds are used to finance environmentally-focused infrastructure, which includes solar panels, water efficiency investments, and GSI practices. The green bond designation was originally self-regulated; however, due to recent and growing concerns for increased issuer accountability, a number of specific green bond certification procedures have been initiated.

Municipalities in 2015 issued a record number of green bonds, according to Bloomberg New Energy Finance. This followed a broader trend as supranational agencies, development banks, corporations and municipalities combined for the largest total issuance of green bonds ever — $46 billion — a 21 percent increase over 2014's total of $37.5 billion, Bloomberg data show.

There is currently no discernable pricing advantage to the official designation. In other words, given identical financial conditions, a green bond would price at the same interest rate as that of a municipal bond. Additionally, there are few large investors with a formal green bond mandate.

Global green bond issuance has slowed since January 2016, in part because issuers are wary of the added costs of the proper green bond certification given murky pricing benefits, according to Bloomberg News.

Social Impact Bonds.

There has been recent increased interest in the topic of ''impact investing,'' which describes investments intended to generate social and environmental benefits as well as a financial return. Impact investors can use ''social impact bonds'' (SIBs) to finance social and environmental projects and programs. SIBs are often utilized through a project delivery framework referred to as a ''pay-for-success'' (PFS) program, in which private investments provide upfront capital to achieve a specific and measurable social or environmental outcome with the public sector only repaying investors if outcomes are achieved, according a July 2015 Brookings Institute report. The first PFS project was launched in 2010, and most have focused on social, health care and employment issues. The first PFS in the water sector was launched in late September, 2016, by DC Water. This $25 million dollar investment in GSI construction was issued as an Environmental Impact Bond (EIB) with an initial term rate of 3.43%, payable in 2021. It ties investor gains to runoff reduction performance in an effort to reduce the financial risk of DC Water to invest in GSI.

The Global Impact Investing Network surveyed nearly 150 impact investors and found that a majority of the target financial returns sought by investors was consistent with market rate returns. An October 2014 NonProfit Quarterly article recently questioned why communities would take on additional financing costs when other cheaper options (grants, municipal bonds, SRF etc.) are available. This is an important point, which remains to be seen with regards to the benefits of SIBs. Additionally, analysts note that those who invest in successful PFS projects are expected to recoup their investment plus a portion of the cost savings the public sector would realize compared to a traditional project, according to a blogpost by the Presidio Graduate School.

Financing Costs.

Figure 2 illustrates the relative interest rates of GSI programs. The actual interest rate attributable to each program begins to become apparent in the graph and sets the stage for a rationale for careful selection of various financing sources for GSI. Table 1 provides information on the annual and total debt service costs as-

Socially Responsible Financing Options

Green Bonds

Average Interest Rate: 2-4%

Common Term: 30 years

Typical Investor(s): US Corporations, Pension Funds, Hedge Funds, Insurance Companies

Key Features:

- No discernable pricing benefit
- Created to focus on environmental projects
- Certification of green bond status adds costs

Social Impact Bonds

Average Interest Rate: Uncertain

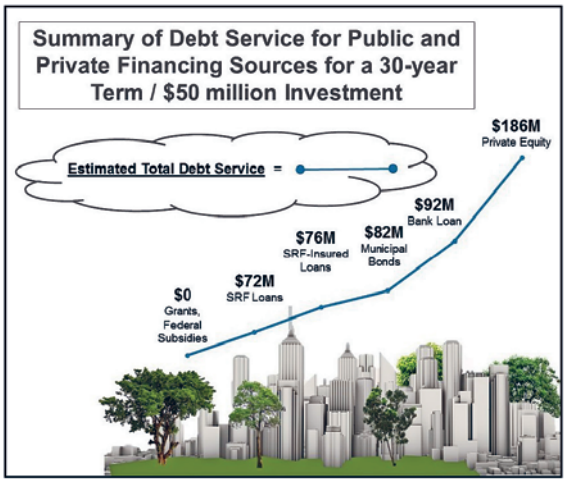
Common Term: Uncertain

Typical Investor(s): Any investor mentioned herein with a social impact or social benefit investment mandate

Key Features:

- Based upon Pay-For-Success project delivery model
- Nascent financing option
- Investors likely require market rate of return or better

EPA. 2016



sociated with differing interest rates for a $50 million investment over a 30-year maturity period. The cost of private equity over other options is clearly the highest cost of financing and is at least 3 times higher than all other options.

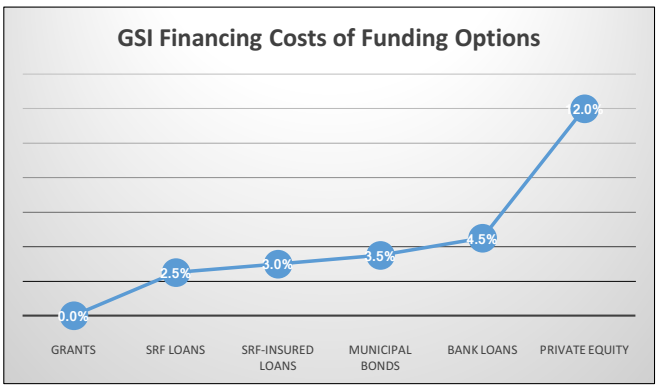


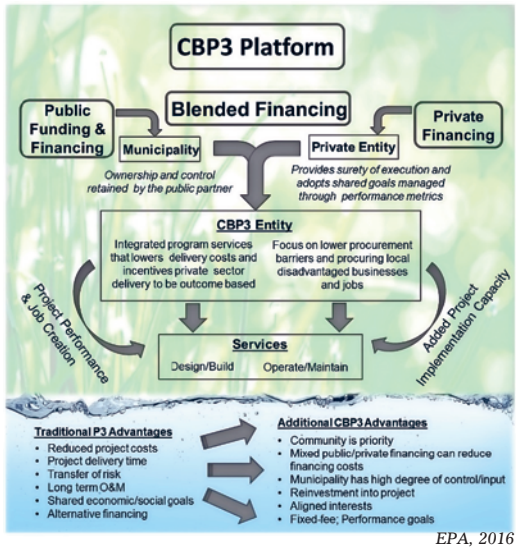
Fig. 2

EPA, 2016

Community-Based Public-Private Partnership (CBP3) Finance-Delivery Platform.

A new model for efficient GSI enhanced project delivery is the CBP3. The CBP3 platform differs from the traditional P3 framework by working through a ''CBP3 entity'' that is supported by both the private and the public entities with the goal of addressing the needs and goals of the community as the top priority rather than maximizing profits for the private entity alone, according to a 2015 EPA report, Community-Based Public-Private Partnerships and Alternative Market-Based Tools for Integrated Green Stormwater Infrastructure. The public entity remains the controlling partner. Communities can benefit from this approach by giving the public sector a high amount of control in the CBP3 entity. This facilitates the public sector's direct control over public investments and assets, which eliminates the risk of the public sector to be impacted by losses to private investors and maximizes community benefits.

The CBP3 platform was developed by the U.S. EPA Region 3. Prince George's County, Maryland, has established the first demonstrated CBP3 program as a way to retrofit 15,000 acres of impervious cover over the next 10 years, while cutting costs by 40 percent to 50 percent.



EPA, 2016

With clear motivation for a need to invest in GSI projects for cleaner water and more resilient communities along with numerous funding and financing options, one last piece of the puzzle remains – putting it all together. The CBP3 platform also provides capacity that most municipalities do not have in order to implement and maintain a large-scale GSI program.

Moreover, not only can the CBP3 take on risk and issue debt more quickly while removing debt issued off the municipality's balance sheet, it can do so at the same rate of interest as a tax-exempt bond issued by a municipality utilizing the SRF bond insurance, without a loss of control by the local government. Based upon conventional wisdom, the cost to provide stormwater retrofits for controlling 2,000 impervious acres may cost up to $300 million (at $150,000 per impervious acre treated. However, through a CBP3 program, these costs can be reduced to $180 million or even significantly less, such as the case of Prince George's County's Clean Water Partnership. Additionally, an SRF guarantee can provide the insurance needed to expand available SRF assistance as well as lower overall financing costs. To place this into another context, a community with 1,665 acres of impervious cover that seeks to retrofit 20 percent of this acreage (333 acres) of impervious cover by investing $10 million per year within a five-year permit cycle would need to raise $2.5 million in annual stormwater fee revenues assuming a 3.5 percent blended rate of interest over a 30-term. Raising $2.5 million annually through stormwater fees may be challenging for some communities. The CBP3 platform could allow a community to reduce annual revenue generation to $1.25-$1.5 million. Obtaining funds through SRF assistance or other similar programs may be able to drive these costs even further. A CBP3 can also provide greater flexibility to access both public and private lands for cheaper, more affordable stormwater controls, whereas public entities are limited to retrofits within public right-of-way.

Conclusion.

With an increase in financing and funding options for large-scale GSI investment, the sector now has the abil-

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ity to blend various public and private sources of funding to develop large-scale, low-cost financing. In short, funding and financing for expanded investment in GSI is possible, and can be done so at a very reasonable cost. However, a capacity challenge for delivering and maintaining large-scale GSI still exists. Municipalities do not typically have such capacity, given the many competing infrastructure needs and interests. A new approach – the CBP3 platform–has emerged as a way to provide a program for providing additional capacity to local governments–for both financing and performance-oriented large-scale GSI implementation, resulting in compliant, resilient communities growing green assets and triple bottom line benefits for generations to come.

The water quality and quantity problems of the 21st century—exacerbated by increasing, extreme weather events—are significant and dynamic. An evolving approach to addressing these challenges, green stormwater infrastructure, has great promise to not only better protect the nation's waters and make cities more resilient, but also to improve our public health, safety, and economic well-being. The information presented highlights ways through which to overcome this barrier, by better understanding the various funding and financing options available, so that the best decisions can be made going forward.

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